

# PATENT SPECIFICATION

686,934

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## COMPLETE SPECIFICATION.

### Improvements in and relating to Moving Coil Loudspeakers.

We, THE PLESSEY COMPANY LIMITED, a British Company, of 56 Vicarage Lane, Ilford, Essex, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to moving coil loudspeakers.

A conventional loudspeaker of the moving coil type consists of a paper diaphragm in the shape of the frustum of a cone. To the smaller end of this is fixed a cylinder upon which is wound a coil of wire known as the voice coil. The larger end carries a corrugated annular surround member whose outer edge is fixed to the rigid chassis of the loudspeaker. The cone is constrained by means of this corrugated surround, and a second centering member, located near the neck of the cone, so that only axial movements are possible. This centering member usually consists of a disc of treated linen or linen impregnated with the material known under the Registered Trade Mark "BAK-LITE", with concentric corrugations. In its centre is a hole through which passes the voice coil former, to which it is stuck by adhesive. In addition two flexible leads are provided to carry electric currents to and from the voice coil. These flexible leads are joined at their outer ends to terminals carried on the rigid chassis of the loudspeaker, and at their inner ends they are anchored to the cone-voice coil assembly. One known method of doing this is to affix eyelets in the cone itself, opposite to the fixed terminals, to which these flexible leads may be soldered together with the ends of the voice coil winding. To achieve this the ends of the voice coil must be led up the side of the cone to the eyelets and in order to prevent them flapping against the cone

and so producing undesirable noises when the loudspeaker is working, they must be securely stuck to the cone between the voice coil and the eyelets. It has been found that the adhesive which is required to stick these wires to the cone will cause the paper cone to distort in shape by the adhesive shrinking as it dries, and such distortion of the cone causes a local weakening which results in the cone going into unwanted modes of vibration at certain frequencies when the loudspeaker is in use.

Another known method of anchoring the inner ends of the flexible leads is to insert eyelets in the material of the centering member near to its inner edge where it is stuck to the voice coil former. To these eyelets are soldered the ends of the flexible leads together with the ends of the voice coil winding. This method overcomes the objections caused when the eyelets are mounted in the cone, but, as the eyelets are now no longer opposite to the terminals in the chassis, when the cone and voice coil assembly moves towards the magnet, the flexible leads tend to tighten and when the movement is in the opposite direction, the leads tend to become looser. To avoid the leads becoming quite taut, and thus restricting the movement of the cone, an amount of slack must be left in the leads to allow for the maximum excursion of movement. When this is done it is often found that when the loudspeaker is reproducing certain frequencies, the flexible leads will go into a vibration of considerable amplitude and hit against the side of the cone, causing an undesirable sound. It is an object of the present invention to overcome this defect.

In the embodiments of the invention shown in the drawing Figs. 1 to 3 show three different methods of securing the flexible leads, Fig. 4 is an end view of Fig. 3 and Fig. 5 is a partial perspective view

of the arrangement shown in Fig. 1, fitted to a loudspeaker.

Referring to the drawings, the flexible leads 1 are secured at their inner ends to eyelets or the like 2, fixed to the centering member 3 near its inner edge, or to some other point near the voice coil former. The flexible leads 1, after leaving these fixing points 2, are each then anchored at a second point near the periphery of the centering member 3 before passing to the fixed terminals 4 on the rigid chassis 5 (Fig. 3). The second anchor point may be an eyelet or tag or the like 6 (Fig. 1) affixed to the centering device 3 or the lead 1 may be threaded through the material of the centering device and back again as indicated by numeral 7 in Fig. 2. The lead may be stuck to the centering device by some suitable adhesive, such as cellulose cement, at the points of contact.

Another method of carrying out the invention would be to bring the flexible lead 1 below the centering member 3, i.e. between the latter and the magnet, between the fixing near the voice coil and the periphery of the centering member 3, and then to pass the lead through a hole 8 (Fig. 3) in the centering member 3, near its outer edge, and on up to the fixed terminal 4 (Fig. 5). The lead may be stuck with suitable adhesive to the centering member where it passes through the hole.

What we claim is:—

A moving coil loudspeaker wherein each lead is anchored near the periphery of a centering member as described with reference to Figs. 1, 2 or 3 of the accompanying drawing.

W. E. P. BAYLY,  
For the Applicants.

#### PROVISIONAL SPECIFICATION.

#### Improvements in and relating to Moving Coil Loudspeakers.

40 We, THE PLESSEY COMPANY LIMITED, a British Company, of 56 Vicerage Lane, Ilford, Essex, do hereby declare this invention to be described in the following statement:—

45 This invention relates to loudspeakers.

A conventional loudspeaker of the moving coil type consists of a paper diaphragm in the shape of the frustum of a cone. To the smaller end of this is fixed a cylinder upon which is wound a coil of wire known as the voice coil. The larger end carries a corrugated annular surround member whose outer edge is fixed to the rigid chassis of the loudspeaker. The cone is constrained by means of this corrugated surround, and a second centering member, located near the neck of the cone, so that only axial movements are possible. This centering member usually consists of a disc of treated linen or the like, with concentric corrugations. In its centre is a hole through which passes the voice coil former, to which it is stuck by adhesive. In addition two flexible leads are provided to carry electric currents to and from the voice coil. These flexible leads are joined at their outer ends to terminals carried on the rigid chassis of the loud speaker, and at their inner ends they are anchored to the cone-voice coil assembly. One known method of doing this is to affix eyelets in the cone itself, opposite to the fixed terminals, to which these flexible leads may be soldered together with the ends of the voice coil winding. To achieve this the ends of the voice

coil must be led up the side of the cone to the eyelets and in order to prevent them flapping against the cone and so producing undesirable noises when the loudspeaker is working, they must be securely stuck to the cone between the voice coil and the eyelets. It has been found that the adhesive which is required to stick these wires to the cone will cause the paper cone to distort in shape by the adhesive shrinking as it dries, and such distortion of the cone causes a local weakening which results in the cone going into untoward modes of vibration at certain frequencies when the loudspeaker is in use.

Another known method of anchoring the inner ends of the flexible leads is to insert eyelets in the material of the centering member near to its inner edge where it is stuck to the voice coil former. To these eyelets are soldered the ends of the flexible leads together with the ends of the voice coil winding. This method overcomes the objections caused when the eyelets are mounted in the cone, but, as the eyelets are now no longer opposite to the terminals in the chassis, when the cone and voice coil assembly moves towards the magnet, the flexible leads tend to tighten and when the movement is in the opposite direction, the leads tend to become looser. To avoid the leads becoming quite taut, and thus restricting the movement of the cone, an amount of slack must be left in the leads to allow for the maximum excursion of movement. When this is done it is often found that when the loudspeaker is repro-

ducing certain frequencies, the flexible lead will go into a vibration of considerable amplitude and hit against the side of the cone, causing an undesirable sound. It is an object of the present invention to overcome this defect.

According to the invention, the flexible leads are secured at their inner ends to eyelets or the like, fixed to the centering member near its inner edge, or to some other point near the voice coil former. The flexible leads, after leaving these fixing points, are each then anchored at a second point near the periphery of the centering member before passing to the fixed terminals on the rigid chassis. The second anchor point may be an eyelet or tag or the like affixed to the centering device or the lead may be threaded through the material

of the centering device and back again, the lead being stuck to the centering device by some suitable adhesive, such as cellulose cement, at the points of contact.

Another method of carrying out the invention would be to bring the flexible lead below the centering member, i.e. between this and the magnet, between the fixing near the voice coil and the periphery of the centering member, and then to pass the lead through a hole in the centering member, near its outer edge, and on up to the fixed terminal, the lead being stuck with suitable adhesive to the centering member where it passes through the hole.

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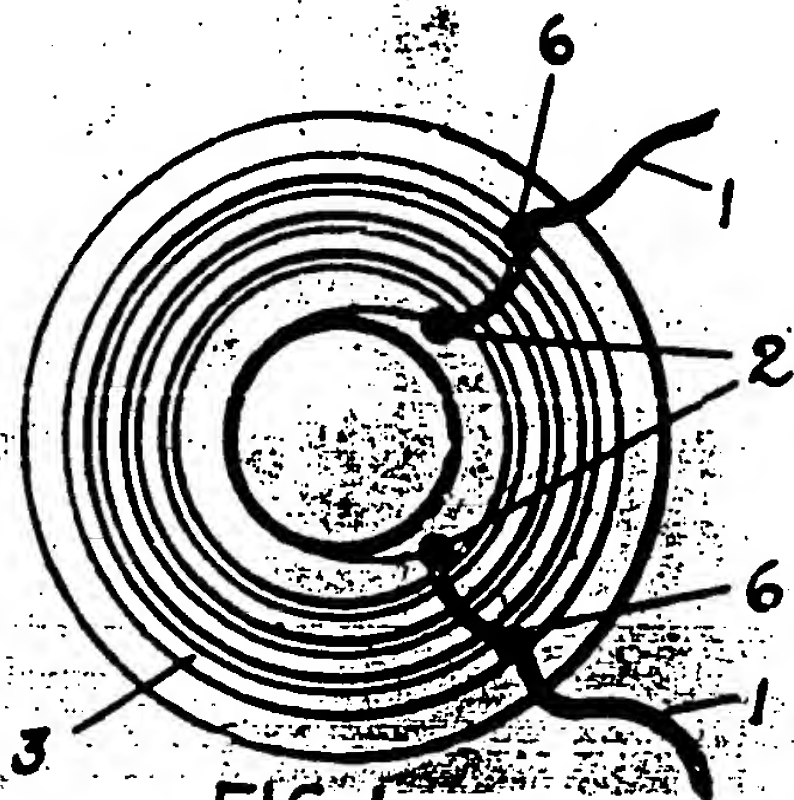


FIG. 1.

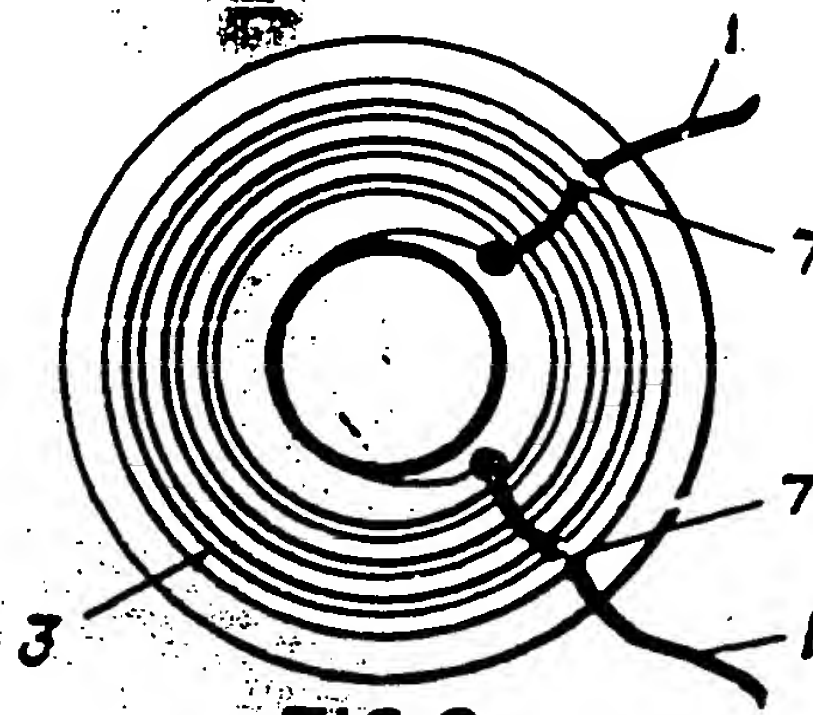


FIG. 2.

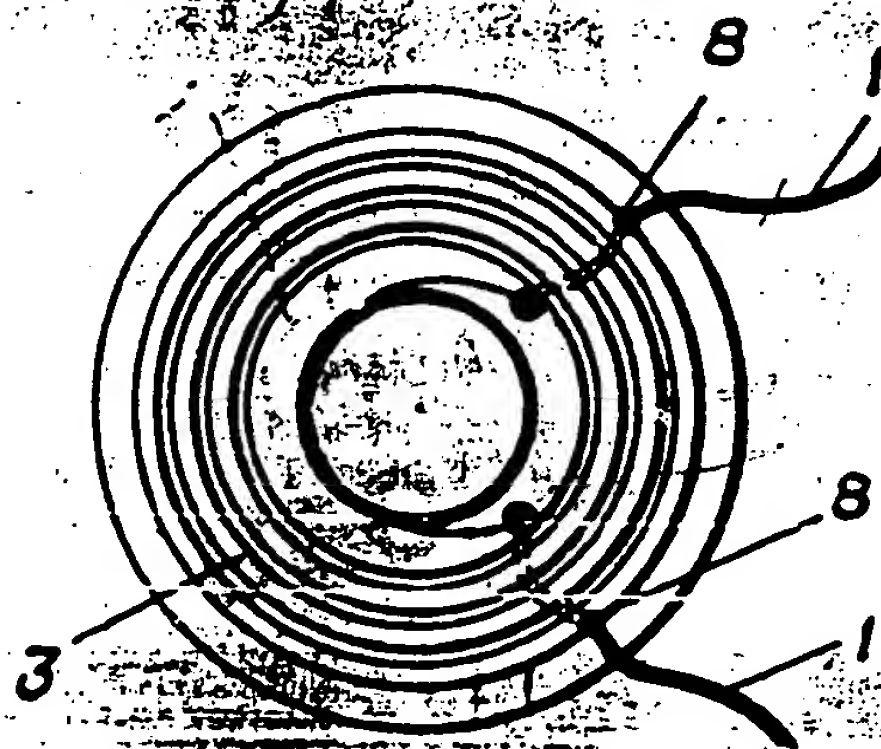


FIG. 3.



FIG. 4.

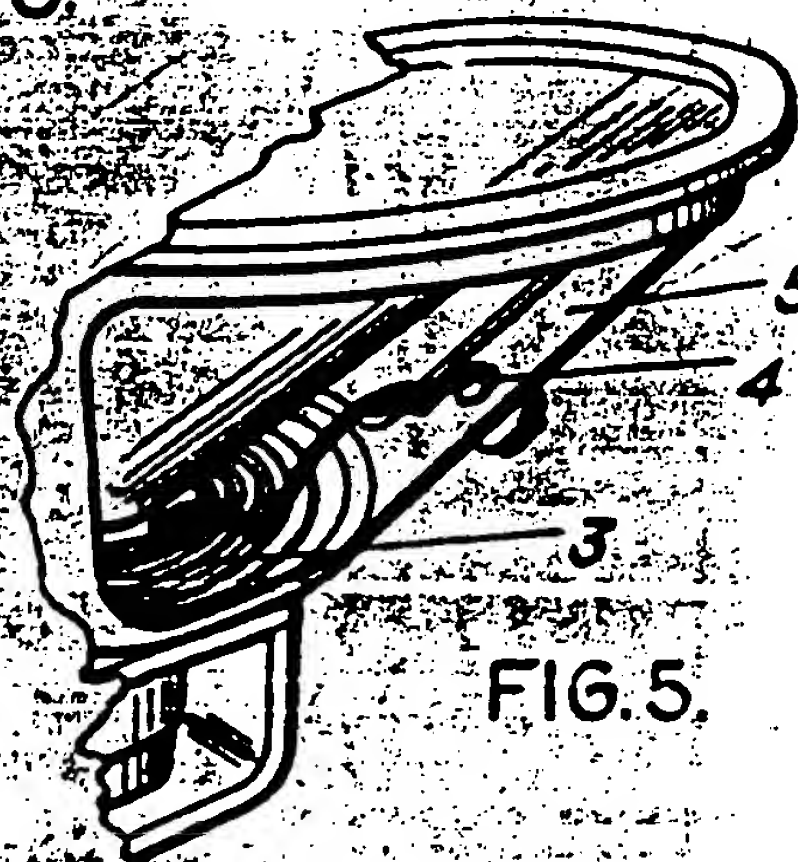


FIG. 5.